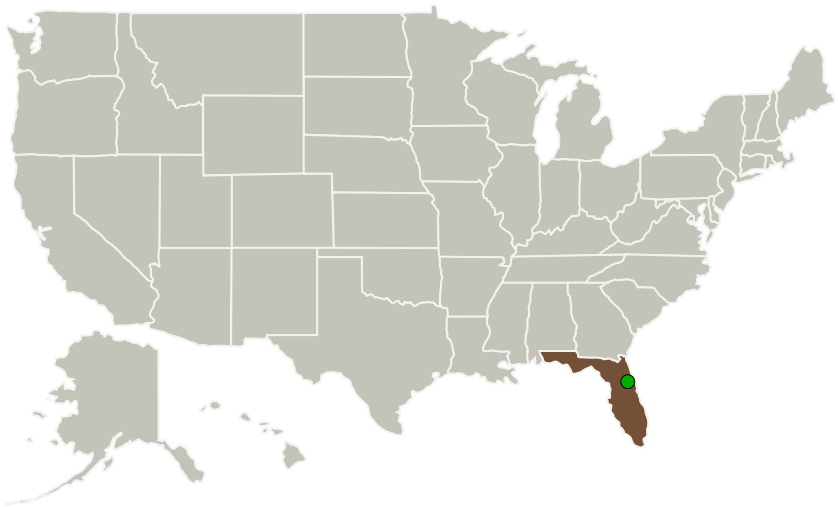
# Manufacture of Novel Cryogenic Thermal Protection Materials, Phase I

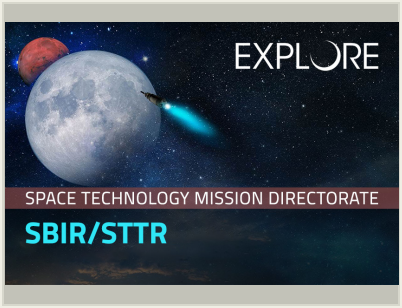
Completed Technology Project (2010 - 2010)

## Project Introduction

Advanced Materials Technology, Inc (AMTI) responds to the NASA SBIR solicitation X8 "Space Cryogenic Systems" under subtopic X8.01, "Cryogenic Fluid Transfer and Handling". The proposed Phase I SBIR program is aimed at developing new cryogenic insulations for passive thermal control, resulting in zero boil-off storage of cryogens. The passive thermal control will serve to limit the heat leak into the cryogenic storage system. The proposed technology is expected to increase reliability, increase cryogenic system performance, and is capable of being made flight qualified for the flight systems and to meet Exploration Systems mission requirements. We propose to develop advanced closed cell organic/inorganic hybrid microfoams offering affordable cost, lightweight, high strength, low thermal conductivity, high thermal stability, and easy processability which will result in improved efficiency and reliability of the cryogenic systems. The proposed approach will be environmentally friendly and will not emit any volatile organic compound (VOC). The closed cell structure of these novel foams will prevent the occurrence of cryopumping. Once the feasibility of fabrication of strong, lightweight cryogenic insulating materials by the proposed technology is demonstrated in Phase I, we shall scale-up this technology in a Phase II program to meet the NASA's requirements.

## Primary U.S. Work Locations and Key Partners



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## Table of Contents

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Advanced Materials Technology, Inc. | Lead Organization | Industry | Tampa, Florida |
| Kennedy Space Center(KSC) | Supporting Organization | NASA Center | Kennedy Space Center, Florida |

| Primary U.S. Work Locations |
|---|
| Florida |

## Project Transitions

**January 2010:** Project Start

**July 2010:** Closed out

**Closeout Summary:** Manufacture of Novel Cryogenic Thermal Protection Materials, Phase I Project Image

**Closeout Documentation:**

- Final Summary Chart Image*(https://techport.nasa.gov/file/140121)*

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Advanced Materials Technology, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Akbar Ghaneh Fard

**Co-Investigator:**

Akbar Ghaneh-fard

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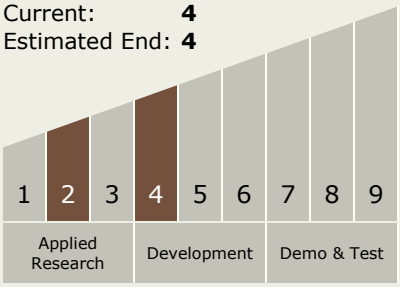
## Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**




## Technology Areas

**Primary:**

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.1 Integrated Systems and Ancillary Technologies

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System